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A request for renumbering claims 17 and 18 to 16 and 17 has been filed pursuant to Rule 88 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).

(54) Fan

(57) The invention relates to a fan adapted for use as component of a ventilation system for a building or a part thereof, for example a dwelling.

The invention provides a fan of the stated type which has the feature that:

the motor directly supports the rotor;

the housing has an opening through which the cavity is accessible from outside;

the motor is supported by a cover with which the opening can be closed; and

the cover can be coupled to the edge of the opening by means of coupling means embodied such that the cover can be coupled without a tool to the opening edge, which coupling means only form part of the edge and the cover, are for instance co-acting screw threads, a bayonet fitting, a snap-coupling.

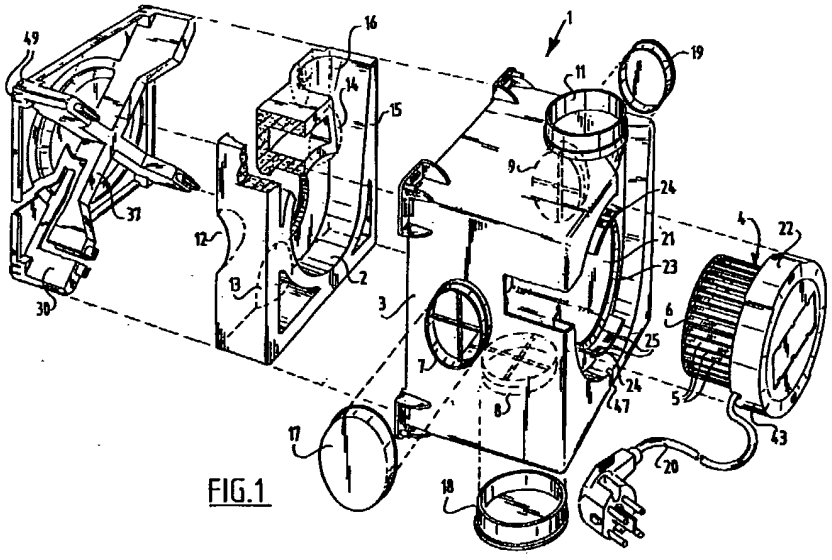

FIG.1

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Description

The invention relates to a fan adapted for use as component of a ventilation system for a building or a part thereof, for example a dwelling. In the fitting of such a fan, which is normally arranged on a wall by a technician, it is considered a drawback that the comparatively heavy motor forms part of the fan during fitting. In this respect it is a first object of the invention to allow fitting of a fan to take place such that the motor is arranged only after fitting of the fan on the supporting surface.

In respect of the above the invention provides a fan of the stated type which has the feature that:

the motor directly supports the rotor;

the housing has an opening through which the cavity is accessible from outside;

the motor is supported by a cover with which the opening can be closed; and

the cover can be coupled to the edge of the opening by means of coupling means embodied such that the cover can be coupled without a tool to the opening edge, which coupling means only form part of the edge and the cover, are for instance co-acting screw threads, a bayonet fitting, a snap-coupling.

An additional advantage of the structure of the invention is that the motor is easily exchangeable, whereby a supplier can provide different motors, i.e. motors of different power, in a standard housing.

In order to avoid a cover with motor being too easy to remove, the embodiment is recommended which has the feature that the coupling means are embodied such that the cover can only be removed from the edge using a tool, for example a snap-coupling which is accessible from outside with a tool.

Claims 3-18 give advantageous embodiments.

The invention will now be elucidated with reference to the accompanying drawings of a number of embodiments, to which the invention is not limited. In the drawings:

figure 1 shows a partly broken away exploded view of a fan according to the invention;

figure 2 shows a longitudinal section of the assembled fan;

figure 3 is a perspective view of the fan during fitting of the housing;

figure 4 shows a detail;

figure 5 shows a partly broken away perspective view in which is shown the coupling between the fan and a feed or discharge pipe for air;

figure 6 shows a partly broken away perspective view of a part of the fan in which is shown the releasable coupling to the housing of the motor carrying the cover;

figure 7 shows a partly broken away perspective view of a part of the fan in which is shown the releasable coupling between the cover and the motor;

figure 8 is a partly broken away perspective view of another embodiment;

figure 9 is a view corresponding with figure 8 of yet another embodiment;

figure 10 is a partly broken away perspective view of a corner support to which is fixed an electricity cable; and

figure 11 shows a perspective view of an insert alternatively arranged in the fan housing.

Figures 1, 2, 3, 4, 5, 6, 7 and 10 all relate to a fan 1 which is adapted for use as component of a ventilation system for a dwelling. The fan 1 comprises a housing 3 enclosing a cavity 2. The fan further comprises a motor 4 which drives for rotation a rotor 6 carrying air displacement blades 5, which blades 5 are accommodated in the cavity 2. The fan further comprises three air inlets 7, 8 and 9 which are each adapted for coupling to an air intake conduit 10 (see figure 5) and debouch into cavity 2. The fan further comprises an air outlet 11 which is adapted for coupling to an air outlet conduit (not drawn) and connects onto the cavity 2. As shown in figure 1, the air inlets 7, 8, 9 lie in one principal plane. They join onto recesses 12, 13, 14 respectively in an insert 15 which is made from foam plastic and which also bounds the cavity 2. The air outlet 10 connects onto an outlet duct 16 extending substantially tangentially of the substantially rotation symmetrical cavity. Caps 17, 18 and 19 can be used to close two of the associated air inlets 7, 8 and 9 respectively, whereby only one air inlet is used. If required, more than one of the air inlets 7, 8 and 9 can also be used simultaneously. By providing the motor 4 with electrical energy by means of an electrical cable 20 the rotor 6 is set into rotation such that air is drawn in from at least one air inlet 7, 8, 9 and blown out via the air outlet 11.

The motor 4 directly supports the rotor 6 with the blades 5. The housing 3 has an opening 21 through which the cavity 2 is accessible from outside. The motor 4 is supported by a cover 22 with which the opening 21 can be closed. This cover 22 can be coupled to the edge 23 of opening 21 by means of coupling means embodied such that cover 22 can be coupled to the opening edge 23 without use of a tool. These coupling means, several examples of which will be described hereinbelow, only form part of the edge 23 and the cover 22. Figures 1, 2 and 6 relate to an embodiment in which use is made of a snap-coupling. Figure 8 relates to the use of co-acting screw threads, while figure 9 shows the use of a bayonet fitting.

Standing lips 24 with holes 25 are present on the edge 23. These are placed in snapping co-action with protrusions 26 present on cover 22. As shown in figure 6, after the snapping connection has been performed, the cover 22 can be removed from housing 3 by inserting for instance a screw-driver 27 in holes 28, whereby the lips 24 can be moved outward so that they disengage from the protrusions 26. For coupling of the cover 22 it can suffice to press the cover 22 carrying the motor 4 axially onto the correct position. A snapping coupling then takes place due to the oblique leading edge of protrusions 26 drawn in figure 2.

In this way is achieved that, after the housing has been fixed to a bearing construction, the motor can be placed without the use of a tool. A tool is however required in order to remove the motor.

The housing is supported on for instance a wall 29 (see for example figure 3) via a base 30. Base 30 fixes the insert 15, which is manufactured from polystyrene foam material, in the housing 3. This housing 3 bears on its corner points corner fastening elements 31 each having slotted holes 32 and 33 extending in two mutually perpendicular directions and an elongate support 34 for the electricity cable 20 which can be fixed in the manner shown in figure 10 to the support 34 by means of a screw 35. Fastening screws 36 (see figure 10) can be placed through slotted holes 32, 33 to fix the housing 3 on the bearing construction, for instance the wall 29 shown in figure 3.

A generally cross-shaped structure 37 is formed on the base 30. This serves to prevent whirling in the cavity 2 and is also dimensioned such that it positions the insert 15 correctly in housing 3. In order to obtain an improved damping of noise resulting from turbulence, use can be made as according to figure 11 of a base 38 which carries a separate cross 39 of acoustic damping material, for example of mineral fibres.

Figure 7 shows that the motor 4 can be placed in snapping co-action with recesses 42 present in the cover 22 by means of snap-lips 40 with oblique leading surface 41. By inserting the screw-driver 27 into the interspace between the peripheral wall 43 of the cover 22 and a snap-lip 40 the coupling between the snap protrusion 44 present thereon and the corresponding recess 42 can be broken whereby the motor 4 with the rotor 6 carrying the blades 5 can be separated from the cover 22, for example for replacement of the motor or for inspection purposes.

The housing 3 consists preferably of plastic and can be produced with any suitable manufacturing method, for instance injection moulding.

Figure 5 shows the manner in which an air inlet or outlet conduit can be connected to an air inlet or air outlet. In the example shown in figure 5 the air inlet conduit 10 fits round the zone of the air inlet 7 protruding furthest outward. An air-tight connection is ensured by means of a strip of sealing adhesive tape 45.

Figure 3 shows that the cable 20 shown in figure 1 and protruding from the peripheral wall 43 of cover 22 extends in the fitted situation of cover 22 between the inner peripheral wall 46 of opening 21 and the outer peripheral wall 43 of cover 22. Via a recess 47 the cable 20 is trained outward, where as according to figure 10 it can be connected to support 34 by means of screw 35, being relieved of tension with a clamping strip 48. The recess 47 is preferably embodied such that cable 22 fits clampingly therein. The interspace between the peripheral walls 43 and 46 is also preferably dimensioned such that cable 20 fits clamping therein with some force.

The bases 30 and 38 can be coupled to housing 3 with snap lips 49.

Figures 8 and 9 show respective fans 49 and 50, whereof the respective covers 51 and 52 are coupled to housings 55 and 56 respectively with a threaded coupling 53 and a bayonet fitting 54. The fans 49 and 50 can otherwise have the same structure as described above.

Claims

1. Fan adapted for use as component of a ventilation system for a building or a part thereof, for example a dwelling, which fan comprises:

a housing enclosing a cavity;

a motor which drives for rotation a rotor carrying air displacement blades, which blades are accommodated in the cavity;

at least one air inlet which is adapted for coupling to an air intake conduit and debouches into the cavity; an air outlet which is adapted for coupling to an air outlet conduit and connects onto the cavity;

this such that during operation of the motor the blades displace air from the air inlet to the air outlet;

characterized in that

the motor directly supports the rotor;

the housing has an opening through which the cavity is accessible from outside;

the motor is supported by a cover with which the opening can be closed; and

the cover can be coupled to the edge of the opening by means of coupling means embodied such that the cover can be coupled without a tool to the opening edge, which coupling means only form part of the edge and the cover, are for instance co-acting screw threads, a bayonet fitting, a snap-coupling.

2. Fan as claimed in claim 1, **characterized in that** the coupling means are embodied such that the cover can only be removed from the edge using a tool, for example a snap-coupling accessible from outside with a tool.

3. Fan as claimed in claim 1, **characterized by** at least two air inlets which are selectable by closing an air inlet not for use with cap means.

4. Fan as claimed in claim 1, **characterized in that** the air inlet(s) and the air outlet lie in one principal plane.

5. Fan as claimed in claim 4, **characterized in that** the cover lies in a principal plane parallel to said principal plane.

6. Fan as claimed in claim 5, **characterized in that** the centre line of the rotor extends perpendicularly of the said principal planes.

7. Fan as claimed in claim 6, **characterized in that** the cavity is bounded by an insert arranged in the housing and has a prismatic form, the cross section of which shows a generally spiral shape.

8. Fan as claimed in claim 7, **characterized in that** the insert is manufactured from polystyrene foam.

9. Fan as claimed in claim 1, **characterized in that** the housing is a plastic injection moulded article, for instance of polypropylene.

10. Fan as claimed in claim 6, **characterized in that** on its side remote from the cover the housing has a base which bears at least one standing plate extending some distance into the cavity for preventing air whirling in this cavity.

11. Fan as claimed in claim 6, **characterized in that** the plate is formed integrally with the base, for instance by thermoforming, deep-drawing or injection moulding.

12. Fan as claimed in claims 3 and 10, **characterized in that** at least one plate is situated between two air inlets.

13. Fan as claimed in claim 10, **characterized in that** the plate consists of a porous damping material, for instance mineral wool.

14. Fan as claimed in claim 1, **characterized in that** an air inlet and/or an air outlet comprises an outward protruding tubular stump, the outer peripheral surface of which comprises a peripheral widening and the free end zone adjacent thereto fits into respectively an air inlet pipe or an air outlet pipe such that such a pipe can be pushed over this end zone up to the widening such that a sealing over the widening and the end of the relevant pipe can be arranged by means of adhesive tape.

15. Fan as claimed in claim 1, **characterized in that** the housing comprises means for fixedly holding an electrical connecting cable connected to the motor, for instance a channel in which the cable fits clampingly.

17. Fan as claimed in claim 1, **characterized in that** the housing has at least two fixing flanges which bear bushes for accommodating fastening screws, in particular self-tapping fastening screws.

18. Fan as claimed in claim 17, **characterized in that** the flanges have slotted holes for passage of fastening screws.

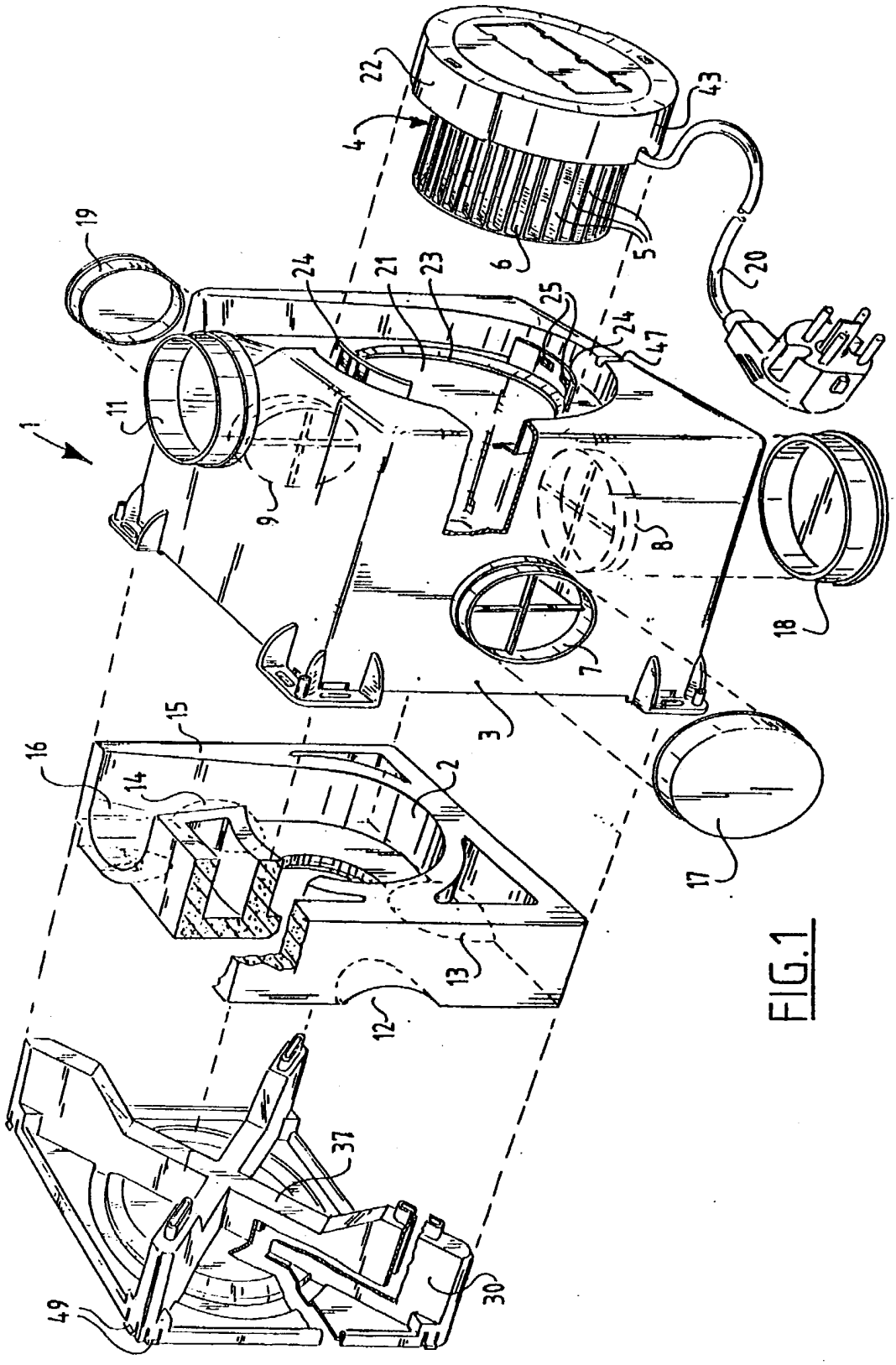
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FIG.1

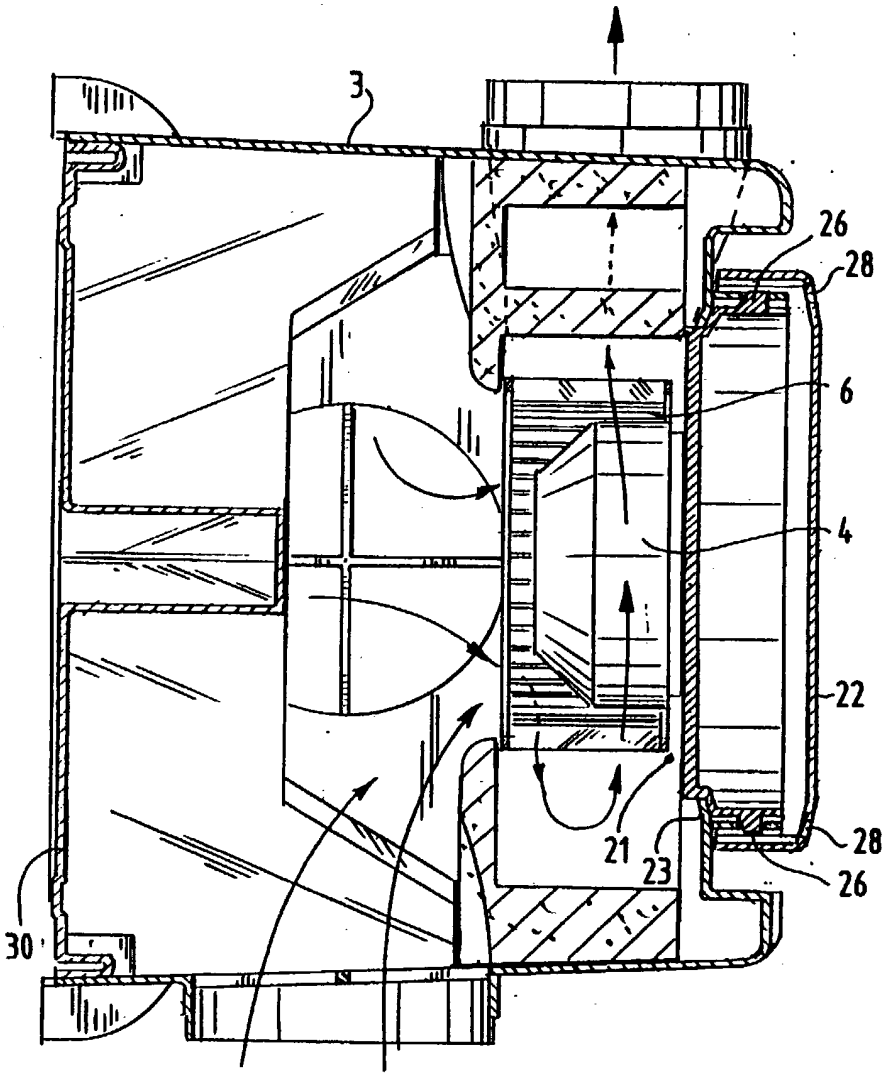

FIG.2

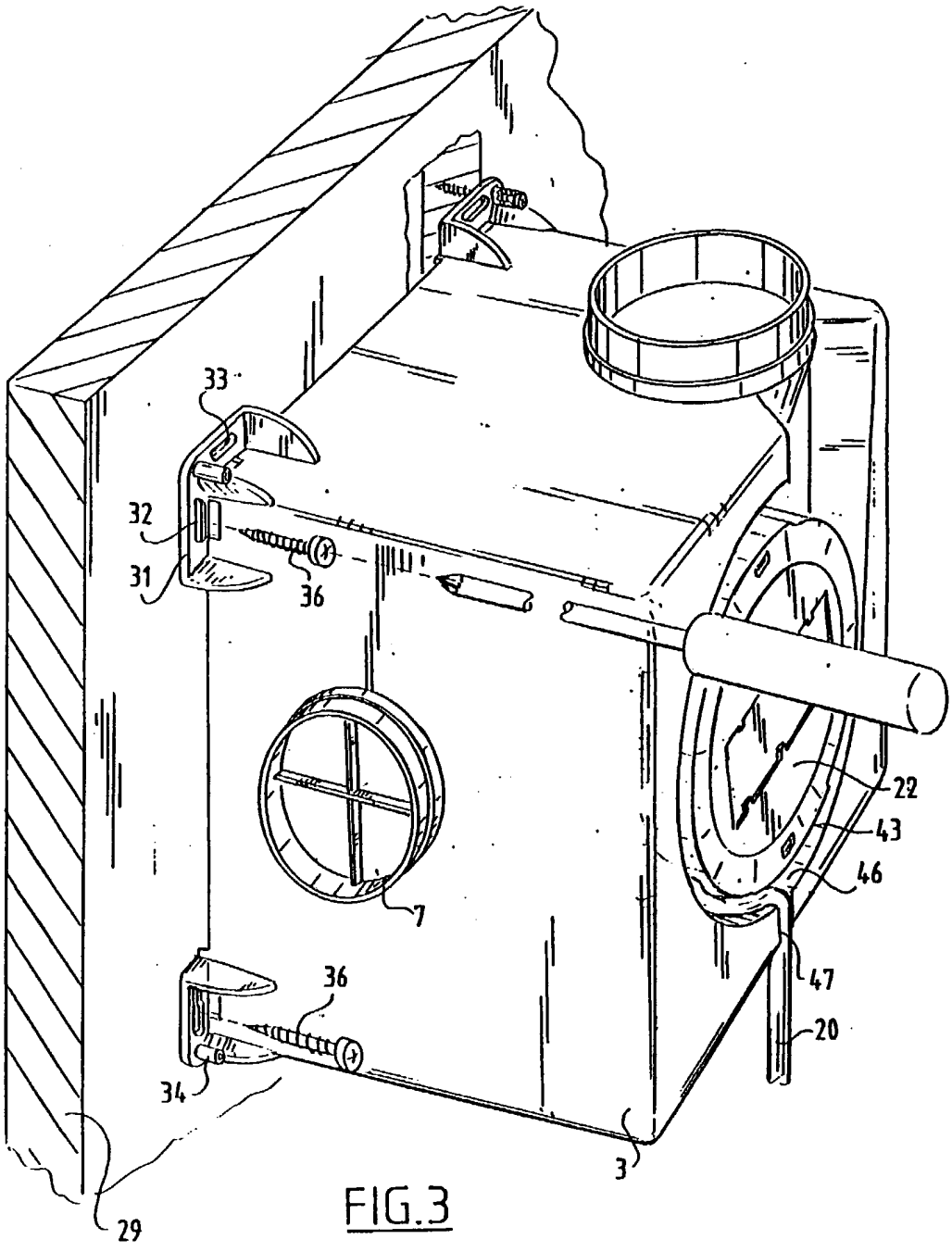

FIG.3

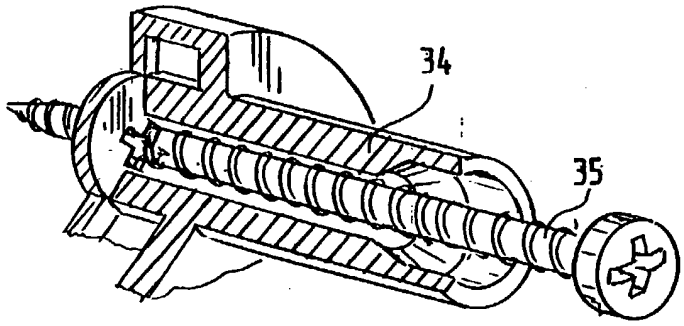

FIG.4

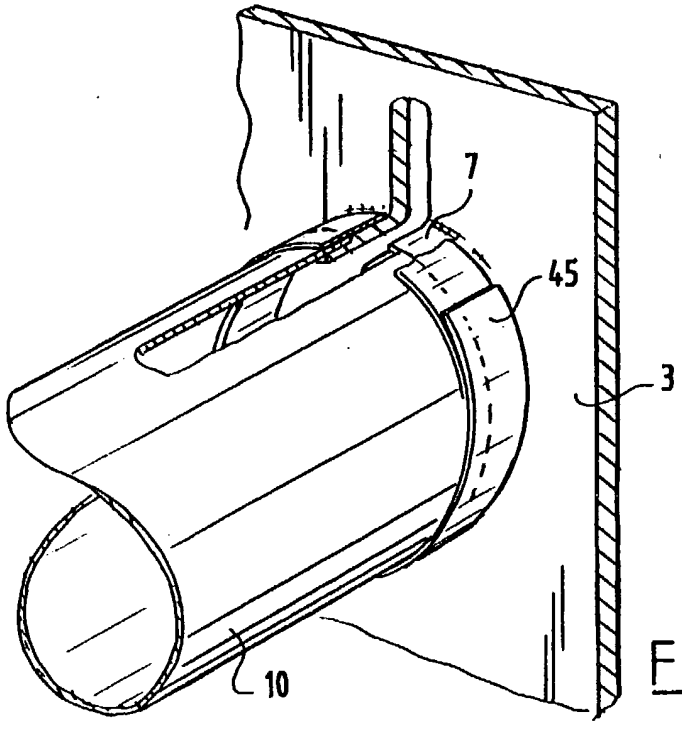

FIG.5

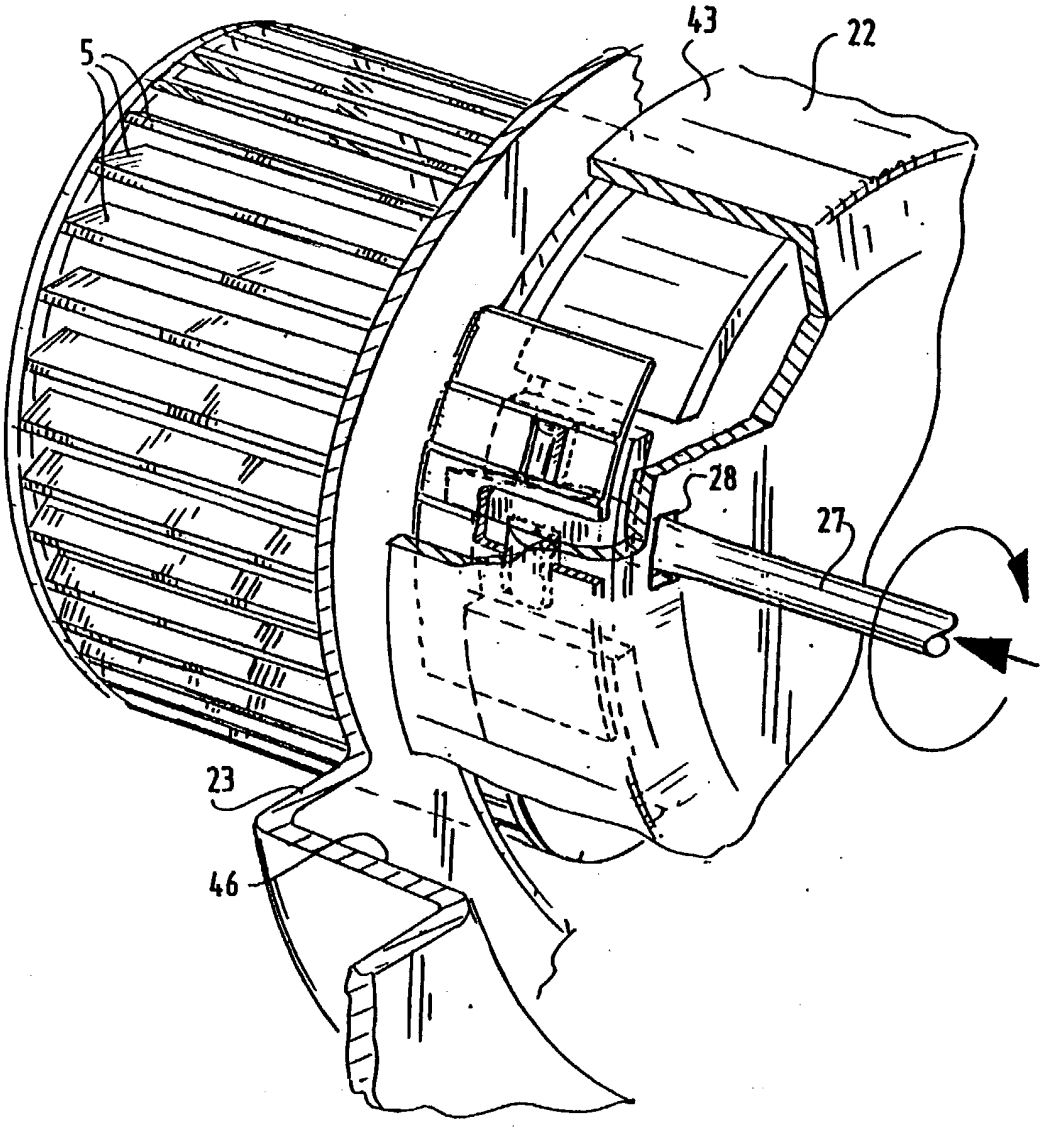

FIG.6

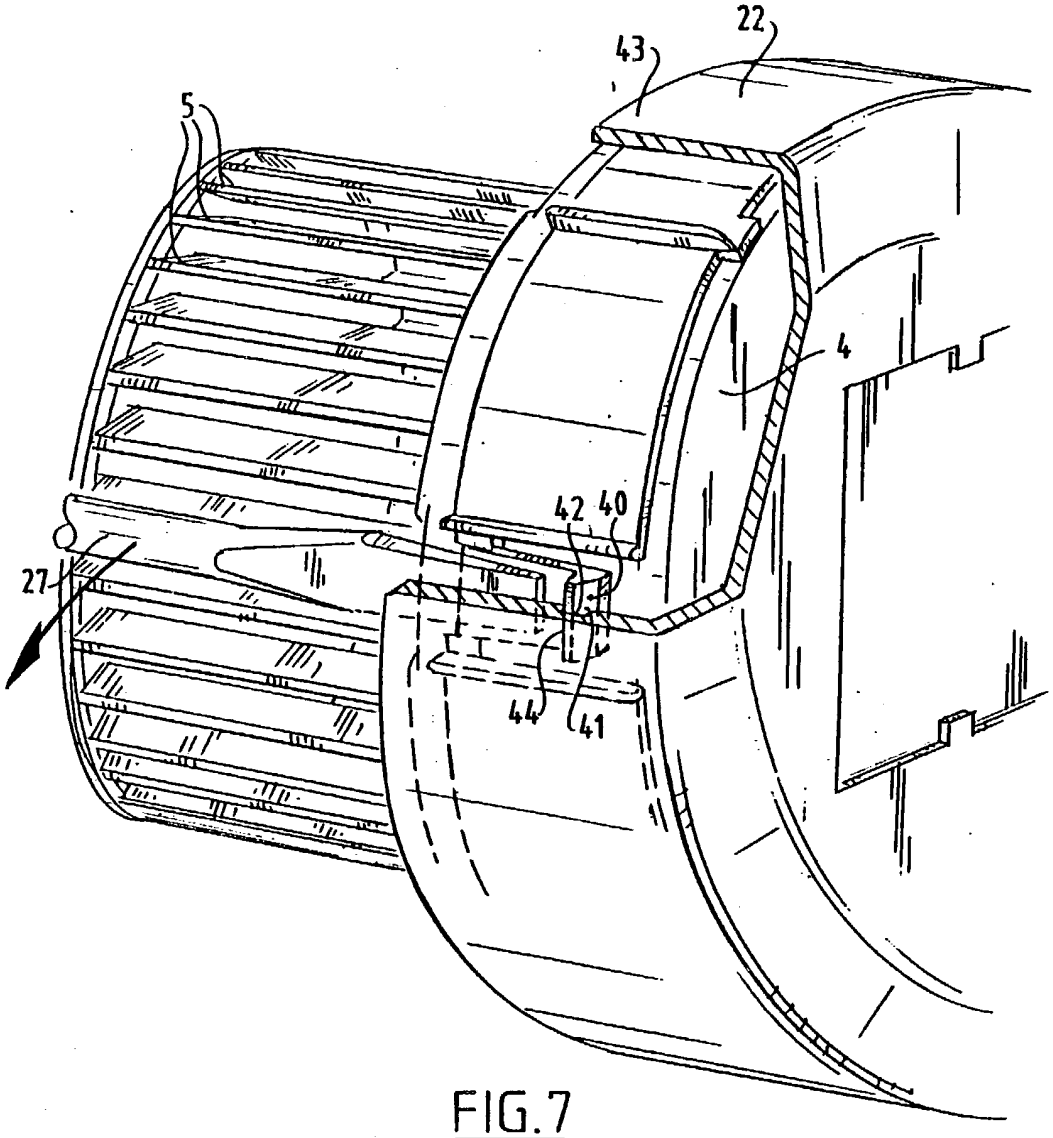

FIG.7

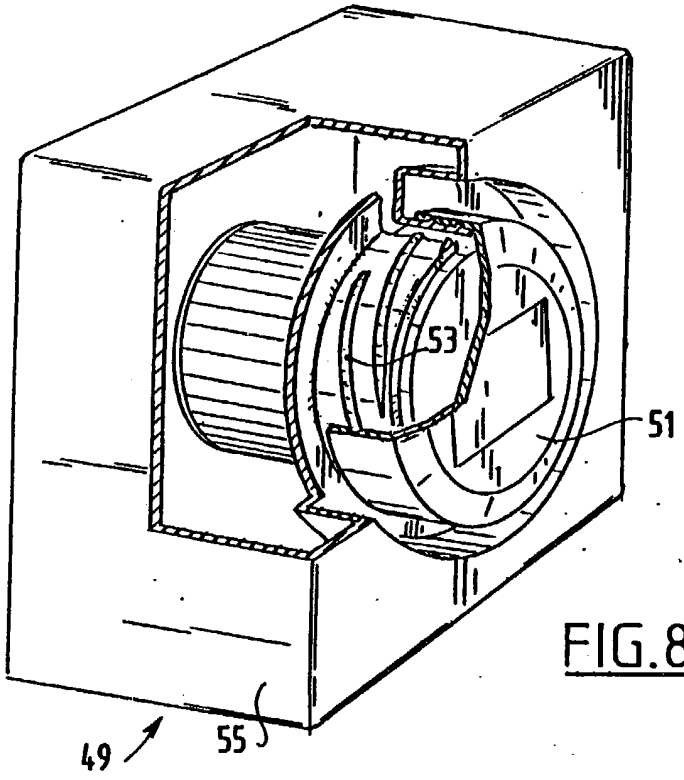

FIG.8

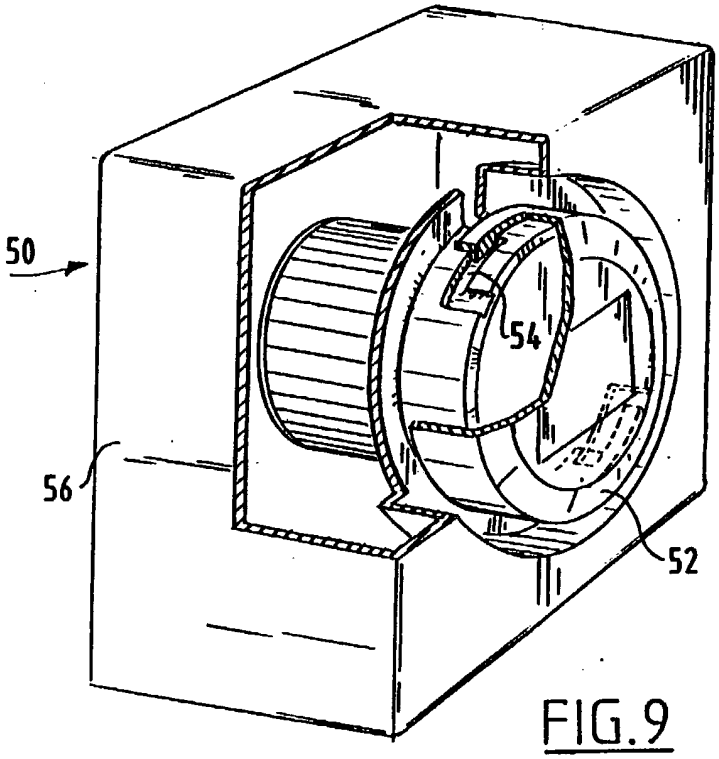

FIG.9

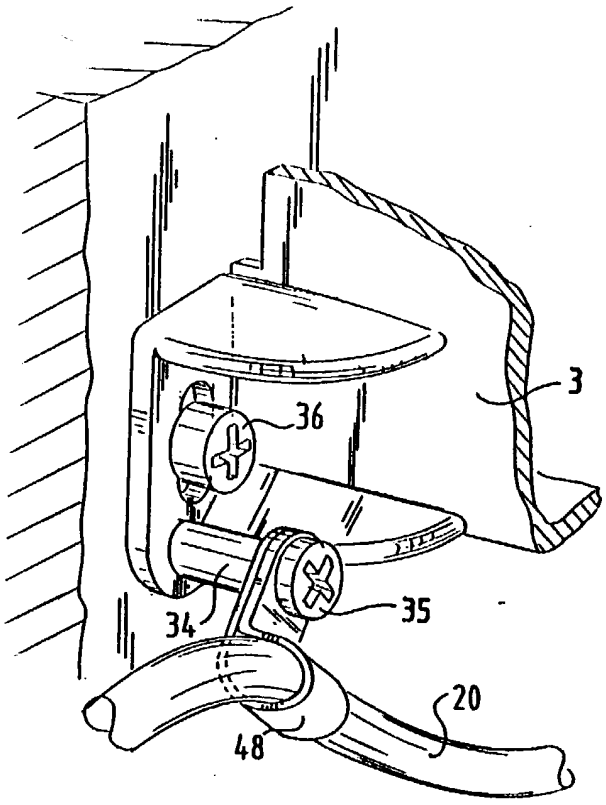

FIG.10

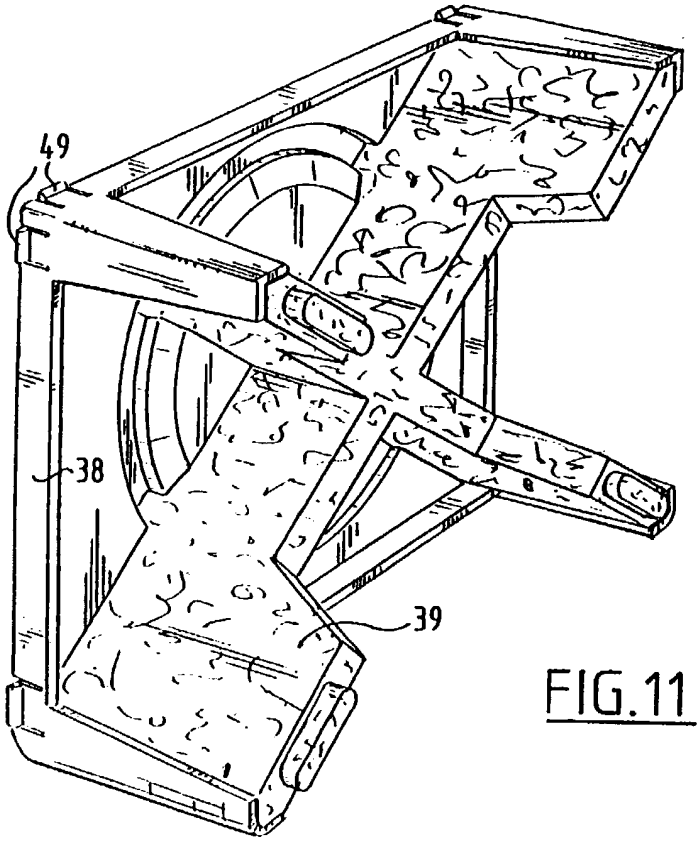

FIG.11